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ORIGINAL ARTICLE

Evaluation of Microbial Quality of Offered Foods in the Restaurant of Educational Center

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KEYWORDS

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ABSTRACT: This study was aimed to evaluate the microbial contamination of offered food (including: cooked meat, cooked rice, cooked kebab, roast chicken and cooked fish, soup, stewed beef, mince stew, vegetable pot roast) in the central restaurant in Qazvin University of Medical sciences in 2016. In this cross-sectional study, 150 food samples were evaluated based on the American Association for Standard Health Care (APHA) and the Food and Drug Standard (FDA) standard. The highest total count (TC) and Coli form count number were in the soup in different seasons (6.20 ± 0.80 and 3.35 ± 0.32 Log_{10} cfu/g respectively). The highest percentage of Total count and E.coli, S. aureus and Salmonella were observed in cooked fish (13%), soup (58%), cooked fish (46%), respectively (P <0.05). in addition, seasonal comparison Showed that the Food samples collected in spring in comparison with seasons had the highest contaminated rate, but the mold count was in the lowest amount. Total count, coliform and yeast contamination between different food samples also showed significant differences (P <0.05).

Conclusion: The results of this study showed that microbial contamination of some foods offered at the restaurant in Qazvin University of Medical Sciences was above the standard limitation.

INTRODUCTION

Food safety is ensure that food will not cause harm to the consumer when it is prepared and consumed according to predetermine for use [1]. According to reports obtained annually 2.1 million people lost their lives as a result of diarrheal disease [2, 3]. In the basis of WHO statistics, every year food borne and waterborne diarrheal diseases cause the death of about 2.2 million people, so that 1.9 million of them are children [4] . S. aureus is one of the most common disease-causing pathogens [5]. Contamination of food with enterotoxigenic S. aureus causes staphylococcal enterotoxins (SEs) intoxication hence the associated symptoms like vomiting and diarrhea [6, 7]. S. aureus is a gram positive, catalase and coagulase positive bactrial [8, 9]. Shiga toxin-producing E. coli as a group of bacteria strains are suitable to produce serious human diseases [10]. O157:H7 is most important serotype subgroup enterohaemorrhagic E. coli [11, 12]. This infection is usually transmitted by food and direct contact or water [13, 14].

According to the Center for Disease Control, about 77% of infections and food poisoning in restaurants, 20% at home and 3% in commercial foods, the lack of health standards and secondary pollution are the cause of many of these diseases. Given the fact that the central kitchen

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college centers for cooking our food, there is a lack of oral health causes among students [15].

Given that the university centers of the central kitchen for cooking our food, lack of hygiene leads to bacterial diseases of animal origin food will be among the students. This study was aimed to determine the microbial contamination of offered food including cooked meat, cooked rice, cooked kebab, roast chicken and cooked fish, soup, stewed beef, mince stew, vegetable pot roast in the Centralized Restaurant in Qazvin University of Medical sciences.

MATERIALS AND METHODS

Food samples included cooked meat, cooked rice, cooked hen, cooked kebab, roast chicken and cooked fish, soup, stewed beef, mince stew, vegetable pot roast that randomly were collected from restaurant in Qazvin University of Medical sciences, Iran. Sampling was taken from main dishes before serving by consumers. The samples put into in sterile plastic containers and carried to the laboratory in refrigerated box at 4°C. Microbial assays were carried out based on standard methods and randomized sampling, standards of institute of standards and industrial research of Iran (ISIRI No. 815, 194, 9263 and 1-8923, ISIRI, 2009). Samples were blended by use of a stomacher and Serial dilutions were prepared, vortexed. Then each of samples was tested on selective culture media for TC, Coliform count, E. coli count, S. aureus count, mold &yeast count and presence of Salmonella spp. based on the APHA [16]. This incubated at 37ºC for 24 hrs. All experiments were conducted in triplicate. Quantitative data on the microbial counts collected from the experiment was subjected to SPSS17 and analysis of variance (ANOVA). Level of significance was considered at $P<0.05$.

RESULTS

The TC, coliforms count, yeast, molds are shown in Table 1. Soup samples collected from restaurant had the highest mean TC and coliform (6.20±0.80 and 3.35±0.32 Log_{10} cfu/g). The information about pathogenic bacteria (Salmonella, S. aureus, E. coli and Pseudomonas) shown in Table 2. Fish samples (13%), soup samples (58%), and fish samples (46%) the highest of pathogenic bacteria including E. coli, S. aureu and salmonella. As shown in Table 2, most yeast was detected in rice samples (2±0.23 Log_{10} cfu/g). In addition, no mildew was detected in food samples.

Table 1. Average TC, coliform, yeast and mold in food testing in different season (Log_{10} cfu / g)

Standard range	Total Bacteria Count	Coliforms	Yeast	Mold
	5.70	2	4	3
Rice	5±0. 27 [a]	3±0.43 [a]	2±0.23 [a]	0
Mince stew	4±0.30 [b]	2±0.01 [b]	0	0
Fish	4.3 3±0.42 [c]	2.55 ±0.3 0 [c]	0	0
Meat	4.11±0.67 [d]	3± 0.47 [d]	0	0
Soup	6.20± 0.80 [e]	3.35±0/32 [e]	0	0
Kebab	3.16 ± 0.44 [f]	3±0.60 [g]	0	0
Roast chicken	1± 0.22 [g]	1.12± 0.45 [h]	0	0
Salad	3± 0.023 [h]	0	0	0
Hen	0	0	0	0
Vegetable pot roast	0	0	0	0

Means in the column with different superscript letters are significantly different ($p<0.05$).

Table 2. Details of the Pathogenic Bacterial Counts During the seasons of spring, summer, autumn.

		Positive Sample for E coli, (%)	Positive Sample for Staphylococcus aureus, (%)	Positive Sample for Salmonell, (%)	Positive Sample for Pseudomons, (%)	Total Sampls
Rice	spring	-	3(20)	2(13)	-	15
	summer	1(6)	-	-	-	
	autumn	-	-	-	-	
Fish	spring	2(13)	2(13)	4(26)	-	15
	summer	-	1(66)	3(20)	-	
	autumn	-	-	-	-	
Soup	spring	-	5(33)	3(20)	-	15
	summer	-	3(20)	-	-	
	autumn	-	-	-	-	
Micestew	spring	-	-	-	-	15
	summer	-	-	-	-	
	autumn	-	-	-	-	
Meat	spring	-	-	-	-	15
	summer	-	-	-	-	
	autumn	-	-	-	-	
Kebab	spring	-	-	-	-	15
	summer	-	-	-	-	
	autumn	-	-	-	-	
Roast chicken	spring	-	-	-	-	15
	summer	-	-	-	-	
	autumn	-	-	-	-	
Salad	spring	-	-	-	-	15
	summer	-	-	-	-	
	autumn	-	-	-	-	
Hen	spring	-	-	-	-	15
	summer	-	-	-	-	
	autumn	-	-	-	-	
Vegetable pot roast	spring	-	-	-	-	15
	summer	-	-	-	-	
	autumn	-	-	-	-	
			Total			150

Negative sign (-) indicates a lack of contamination with pathogenicMicroorganisms.

A Significant difference was observed in total bacteria, coliforms and molds between food samples. Total bacteria and coliforms numbers in soup, meat, kebab, rice were more than standard levels (5.70 and 2 $\log_{10}$ cfu/g).

DISCUSSION

Food-borne diseases as a global health problem are posed due to expansion of tourism and traveling, and consumption of food outside the home in different societies. Also Food poisoning in developing countries is an important health problem caused by food ontaminated with pathogenic bacteria.

Therefore, maintaining and providing of healthy food is a vital measurement for continuous control. One of the most important steps in controlling the health of food is on the supply level. The aim of this study was to evaluate

the microbial quality of food offered at Qazvin University of Medical Sciences.

According to the national standard, the TC, coliforms count, yeast, molds are respectively 5.70, 2, 4, 3 Log_{10} cfu / g[17].

Coliforms as an indicator of microbial control in foodstuffs so exist in many foods, especially salads and kebab it is almost inevitable. Control of E. coli is important because of the presence of dangerous serotypes [18].

In the present study, rice, soup, and kebab were identified as foods with high amounts of total bacteria and coli forms. Rice and fish had the highest E.coli contamination among foods. Rice, soup, kebab and fish had the most contaminated samples by means of total bacteria, coliforms, yeast and mold. However, the test results for these samples were in the normal range. This may be related to primary materials, food manipulation by personnel, service conditions, or incorrect cooking times. In addition, the cooking temperature and temperature distribution in the food can be another factor affecting food contamination [16]. In this study, the counting of pathogenic bacteria showed that some of the samples were contaminated. These findings are in line with a study conducted in Argentina [19] which shows that there are similar findings regarding TC and E.coli in fried rice and malt samples. The result of TC and coliform count on kebab showed that contamination was 4.55 log_{10} cfu/g and 2.27 log_{10} cfu/g; respectively, which was consistent our results. Findings of the performed study by Nemati et al. (2008) on kebab haves shown that the TC and coliform counts were 3.50 log_{10} cfu/g and 3.22 log_{10} cfu/g, respectively which was consistent our result. Insufficient heat and secondary contamination after cooking, inappropriate preparation and contaminated masher could be effective in food contamination [20].

According to the national standard, the pathogenic microorganisms in the cooked food are negative [17]. Contamination caused by S. aureus can probably shows that the pollution caused by human contact [21]. Due to the presence of S. aureus in samples collected, the possibility of contamination with human manipulation [22]. Preparation of crude material, the heating process and adding preservative materials could decrease Pathogenic bacteria such as S. aureus, Salmonella and E.coli, and other species of Enterobacteriaceae [23]. In a study by Fang et al for microbial contamination was conducted in academic centers in Taiwan showed the coliforms, S. aureus, E. coli and B. cereus, respectively, 27.5, 17.9, 7.9 and 4.98 percent [15]. That was consistent with the study, almost.

in study by Mahmoudi et al. (2014) was aimed to determine the microbial contamination and chemical quality of food stuff in catering services and restaurants in Iran, Microbial analysis showed that the meat and fish had the highest total count (TC) and Coli forms count (6.12±0.99 and 4.91±0.37 Log cfu/g respectively) ($P<0.05$) [24].

Results showed that the microbial contaminations in all food samples analyzed required preventive considerations. The results of this study showed that microbial contamination of some of the foods offered at the restaurant above the acceptable standards. The main cause of pollution, failure to comply of personnel health standards and quality of raw materials is. Given that more pollution, secondary infections were so reform cook and food processing, Cross- contamination prevention and control and ongoing monitoring, especially the health of the restaurant staff, the most important measures intended to prevent food contamination. In addition, the results of this survey can be used to inform restaurant managers, policymakers and people about the quality and safety of food related to microbiological and chemical composition.

CONCLUSIONS

The results of this study showed that microbial contamination of some foods offered at the restaurant in Qazvin University of Medical Sciences was above the standard limitation.

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Conflicts of interest

There is no contradiction between the authors of this study.

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